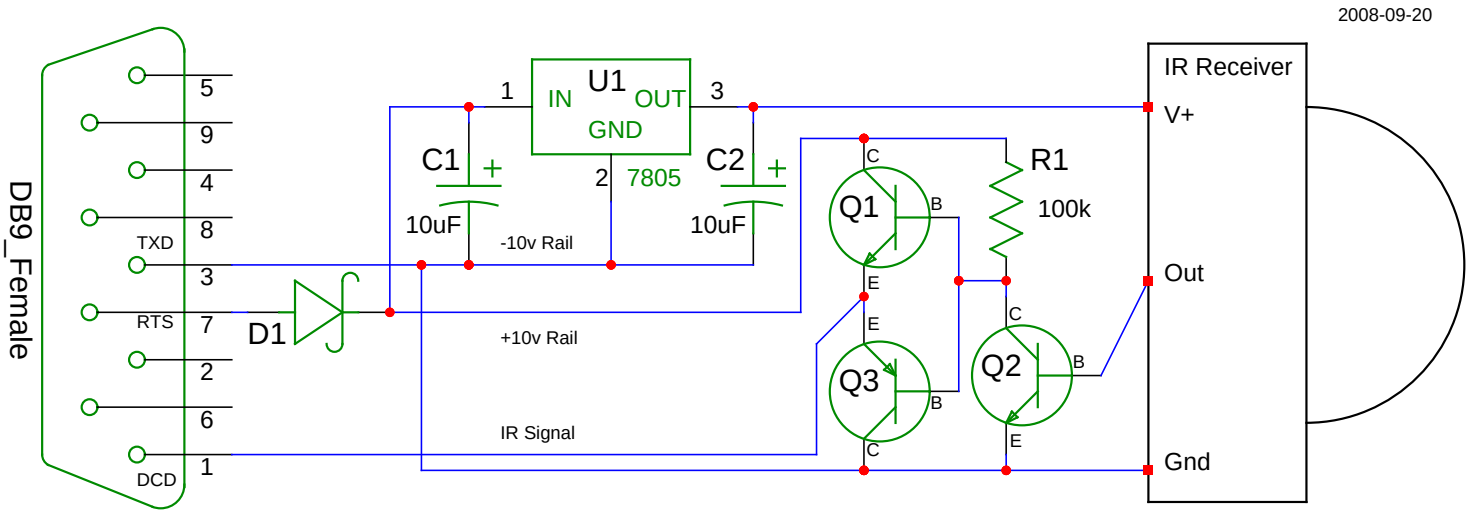
LIRC Compatible Serial Port Enhanced IR Receiver



I freely admit that I'm not the first to post a circuit similar to this, but I do seem to be the first to adequately describe it.

All parts should be rated to handle 35v. A negative voltage is used instead of the traditional ground. In some whacked situations, the serial port outputs could be 13v in each direction for a 26v total swing. Generally the serial port will be +/-10v, though.

U1 assembly (upper left) is an LM7805 and is used to power the IR receiver. D1 is a low dropout diode (1n4148 or bat46) and protects U1 from reverse voltage. A rectifier diode (1n4007) could be used but might have too much voltage drop. IR receivers need clean and steady power to be stable. Computer power supplies are notoriously noisy. If it has problems, increase the size of C1 and C2 and parallel them with a 100nF ceramic capacitor each. If there are still problems, add a 1mH inductor right after D1. If there are still problems, add a 2-50ohm resistor before C2. If there are still problems (and I'm getting tired of saying this so many times), add a .1-1uF ceramic capacitor between pins 3 and 7. U1 may be replaced by a different voltage regulator so long as it meets the power requirements for the IR receiver.

Q1+Q2+Q3+R1 form a simple amplifier since the IR receiver's signal output will only be 5v pulses. Some serial ports may not be sensitive enough to respond to 5v (especially with long cable runs), so this amplifier brings the signal back up to standard levels. Q1 and Q2 are bc548 NPN transistors. Q3 is a bc558 PNP transistor. Other signal level transistors may be used so long as speed and voltage ratings are observed. If an oscilloscope shows the amplifier voltage dropping when in use, try adding a 10-100uF capacitor between Q1's collector and Q3's collector. If there is a noisy line issue, and inductor and resistor between D1 and Q1's collector could be added similar to the IR Receiver method. Note that this is an inverting amplifier and the serial port usually needs an inverted signal from the IR receiver.

The IR receiver IC is a standard 3 pin type that is fairly common. I built my circuit using a Radio Shack 276-640 (38kHz, 2.4-5.4v, 940nM +/-50nM). Others may be used or salvaged from parts (some work better than others), but be sure to observe pin outs and voltage levels. If the frequency isn't properly matched with your IR remote transmitter, the range is usually reduced. Check your specs before you buy and build. Most consumer IR tranmistters are 38kHz, some are 36kHz. Some of the newer ones operate 40-56kHz. Some IR IC's may need a tube in front of the optics to help block out stray ambient light.

Activity status LED's may be added, but do not go overboard as the serial port is a low power device and can only handle so much. A power LED+500ohm resistor may be added in parallel to C2. A status LED+500ohm resistor may be added between Out and Ground of the IR receiver if its output drive is sufficient (not really a good idea, though). A status LED+2200ohm resistor may be added on the IR Signal line (pin 1) to pin 3 (still may cause signal drop out, though).

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